LIMADORA

SHAPING MACHINE
Type SH-800

The Machine Mechanical Booklet

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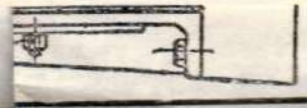

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I. MAIN TECHNICAL FEATURES

1.1. Main dimensions

Ram stroke length, maximum	800 mm
minimum	50 mm
Maximum planing width	750 mm
Distance between the lower ram face and the upper useful table face, maximum	450 mm
minimum	70 mm
Overal size (length × width × height)	3 020 × 1 400 × 1 780 mm
Machine weight (without accessories)	4 200 kg

1.1.1. The fix table

Length × width × height	800 × 425 × 400 mm
Maximum table stroke (manual or automatic drive) horizontally	750 mm
vertically	380 mm

1.1.2. The tool slide

Maximum tool section	25 × 45 mm
Maximum vertical stroke of tool slide (manual downward and upward movement and only downward automatic movement)	180 mm
Tool-slide rotation angle	±60°
Tool-slide tilting angle	±15°

1.2. The machine kinematics

No. of ram double-stroke steps. per minute	8
Ram double-strokes (d.s.) per minute	11.2; 16; 22.4; 31.5; 45; 63; 90; 125.
Table feeds: horizontal	stepless 0 . . . 2.5 mm/d.s.
vertical	0 . . . 0.8 mm/d.s.
Rapid feeds: horizontal	1 200 mm/min
vertical	400 mm/min
Vertical downward tool-slide feed	stepless 0 . . . 1.0 mm/d.s.

1.3. The machine drive

Electric motor for main drive (three-phase asynchronous) type ASI 132 M4/2 power	5.2/6.5 kW
speed	1 500/3 000 r.p.m.
Electric motor for rapid feed (three-phase asynchronous) ASI 90 F5/4	
Type	
power	1,5 kW
speed	1 500 r.p.m.

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2. ACCESSORY LIST

Each S 800 shaping machine is endowed with a number of devices, tools, etc. which are called normal accessories. The devices serving for special operations at the shaping machine are called special accessories and are supplied only at the request of the customer.

2.1. Normal accessories

Rotating parallel vice MG 250 type
Special crank for the table feeds
Crank key with square hole 17
Handle for locking the support on the frame
Lighting lamp

GEAR TABLE

Code No. (see kinamatic) diagram)	No. of teeth	Modulus m (mm)	Tooth slope	Specific tool shift	Gear rim width	Remarks
1	2	3	4	5	6	7
20—25	40	2	0	0	13	
20—50	25	3	0	+0,10	18	
20—51	21	3	0	—0,161	18	
20—62	45	3	0	—0,18	24	
20—63	21	3	0	+0,32	24	
20—72	40	3	0	—0,306	18	
20—78	35	3	0	—0,10	18	
20—79	29	3	0	+0,18	26	
20—82	53	3	0	—0,32	24	
20—84	20	4,5	20° right	+0,28	45	
20—90	47	4,5	20° left	—0,28	47	
20—93	23	4,5	15° right	+0,53	70	
30—15	45	2,5	0	0	20	c
30—18	25	2,5	0	0	20	c
30—44	18	2	0	0	20	
30—53	72	2	0	—0,4644	10	i
30—54	70	2	0	+0,5304	22	i
30—60	72	2	0	—0,4614	10	i
30—66	145	4,5	15° left	0	60	
40—15	17	2	0	0	8	
40—22	17	2	0	0	8	
40—44	21	2	0	0	10	
40—51	21	2	0	0	10	
40—61	23	2	0	0	17	
40—80	44	1	4°24′ right	0	—	r.m.
40—84	8	2	0	0	15	s
40—91	1	1	4°24′ right	0	—	m
52—02	24	1,5	0	0	15	
52—13	31	2	0	0	13	i
52—14	35	2	0	0,625	13	i
52—15	18	2	0	0	25,5	
52—33	54	2	0	0	—	m
52—41	24	3	0	0	15	c
52—45	20	3	0	0	15	c

Code No. (see kinamatic diagram)	No. of teeth	Modulus m (mm)	Tooth slope	Specific tool shift	Gear rim width	Remarks
1	2	3	4	5	6	7
52—61	23(138)	1,5	0	0	—	s
52—80	12(82)	2	0	0	—	s
52—85	30	2	0	0	15	c
52—103	3	2	8° 31′ 5″	0	—	m
60—33	30	3	0	0	19	c
60—47	20	3	0	0	18	c
61—08	20	3	0	0	18	c
61—43	59	2	0	0	15	
a) 61—43	33	3	0	0	18	c
61—62	35	2	0	0	15	c
61—78	35	2	0	0	15	c
62—05	80	3	7° 39′ left	0	40	
62—31	22	2,5	0	0	15,4	c
62—33	2	3,026	7° 39′ left	0	—	m
70—92	72	2	0	0	12	
70—98	16	1,5	0	0	14	
70—102	16	1,5	0	0		
90—22	1	2,5	7° 7′ 30″ right	0		m
90—29	40	2,5	7° 7′ 30″ right	0	25	rm

NOTE:

In the column „Remarks" the following abbreviations have been used
c — spur bevel wheel
s — toothed segment
i — spur gear wheel with inner teeth
m — cylindrical worm
rm — worm wheel.

BALL BEARING SPECIFICATION

Code No. (see kinematic diagram)	Ball-bearing denomination	Symbols	Size			Pieces	Remarks
			Ø int.	Ø ext.	width		
1	2	3	4	5	6	7	8
20—16	Radial ball-bearing with one row of balls	6213	65	120	23	2	Normal precision
20—24	Radial ball-bearing with balls on one row	6206	30	62	16	1	„
20—46	Radial ball-bearing with balls on one row	6207	35	72	17	1	„
20—53	„ „ „	6306	30	72	19	1	„
20—65	„ „ „	6308	40	90	23	1	„
20—87	„ „ „	6307	35	80	21	1	„
20—91	Radial axial bearing with tapered rollers on one row	3230	50	110	42	1	„
21—42	Radial axial bearing with balls on two rows	3201	15	32	159	1	„
30—31	Radial bearing with barrel rollers on two rows	22308	40	90	33	1	„
52—40	Axial ball bearing with balls on one row	51109	45	65	14	1	„
52—46	„ „ „	51110	50	70	14	1	„
52—100	Radial ball bearing with balls on one row	6005	25	47	12	2	„
52—102	Axial ball bearing with balls on one row	51106	30	47	11	1	„
60—34	Axial ball bearing with balls on one row	51110	50	70	14	1	„
60—45	„ „ „	51106	17	47	11	1	„
61—57	„ „ „	51203	30	35	12	1	„
61—68	„ „ „	51105	25	42	11	1	„
61—68	„ „ „	51109	45	65	14	1	„
70—89	Radial ball bearing with tapered rollers on one row	6203	17	40	12	2	„
101—22	„ „ „	6202	15	35	11	2	„
20—115	Radial bearing with cylindric rollers on one row	NUP 308	40	90	29	1	„
20—116	Radial bearing with balls on one row	6407	35	100	25	1	„

LUBRICATION DIRECTIONS

Lubrication features			Position in lubricating schema
Denomination	Correspondance SHELL	Symbolization	
Oil 108	Tolona Oil 30	□	1 17
RUL SL 140	Grease FP 3 or Alvania Fett 3	△	18 23
Oil 413	Cornea Oil 69	⊗	24

LUBRICATING INSTRUCTIONS

Lubricating frequency	Marking	Quantity of lubricants	Lubricating place No.	Remarks
		1 cm³	2	
Daily	——	2 cm³	3; 6; 7; 8; 9; 10; 11; 12; 13; 14; 15; 16; 17;	
		4 cm³	1; 4; 5;	
Monthly	—·—·—	6 cm³	18; 19; 20; 21; 22; 23	
If necessary	— — —	17 litres	24	

The oil level will be continuously controlled through the sight-glass 5 (Draving 5).

The present instructions have been made for one shift machine work. If the machine will be exploited in 2 or 3 shifts the respective modification will be made in heading: „Lubricating frequency".

By oil change, pull out the drain plug 15 (Drawing 5).

3. INTRODUCTION

The machine technical booklet is a guide the porpose of which is to make known to those interesed the prescriptions concerning the installing, operating, manoeuvring and maintaining the S 800 shaping machine. These prescriptions must be rigorously followed, since it is only in this way that the best operation conditions are insured for the machine and the expected results can be obtained.

The machine technical booklet would miss its aim if the workers handling and foremen of the sections concerned, are not repairing the machine, as well as the foremen of the sections concerned, are not thoroughly familiar with its contents, before putting the machine into service.

4. DESCRIPTION OF THE MACHINE

4.1. Generalities

The S 800 shaping machine is a machine-tool intended for processing by planing horizontal, vertical or oblique plane surfaces of various forms. By making use of special devices, it is possible to cut key ways in wheel hubs or grooves of various shapes. With the aid of a dividing mechanism it is possible to cut wheel teeth or chain wheels, etc. By means of hydraulic copying device it is possible to shape parts with a more complicated profile as well.

The S 800 shaping machine operates mechanically. The general view of the machine is shown in drawing 1.

The shaping machine is driven by an electric motor, which provides the ram main alternating movement and the table secondary intermittent movement (the horizontal and vertical work feed).

The tool cutting speed depends upon the number of ram double strokes per minute and the work-stroke length. In order to maintain the cutting speed at a value approaching the optimum speed, it is necessary to modify the number of double stroks performed by the ram per unit of time. To this effect, within the electro-motor and the ram driving mechanism is installed a gear box. The movement is transmitted from the box to the toothed rim of the link wheel. The ram alternating straight-line motion is obtained through a swinging link mechanism. This mechanism has the advantage of ensuring, without the aid of special elements, a return speed higher than the speed during the active stroke.

The ram glides between the horizontal guiding rails located at the upper part of the frame. The tool is secured in the cutter head situated at the loading end of the ram. On the frame frontal face is moving on vertical guiding rails the table cross support. The part to be machined is secured on the machine table, which moves along the guiding rails on the cross support with an intermittent feed movement. In addition on the work feed, the table can be moved in all directions by hand or with rapid feed.

4.2. The frame

The frame consists of two sections. The upper sections contain all the main mechanisms of the machine, namely: the gear box, the link mechanism, the feed mechanism, the central lubricating device, the driving electro-motor, the electrical equipment, etc.

On the front part of the frame are located the table support guiding rails, while at the upper part of the frame are the ram guiding rails. At the upper part

of the frame, at right, is built a control panel which are concentrated the electrical equipment push-buttons, the coupling driving arm and the handles used for speed change.

The link wheel gliding bearings are included within the frame walls.

The machine is fixed upon the foundation with the lower part of the frame, serves also as oil bath.

4.3. The gear box

The gear box forms an independent unit in its own housing. The gear box housing is cylindrical and is guided in two circular opening in the frame.

Directly behind the driving pulley is mounted the disk clutch with its brake. The claws gripping the clutch disks are actuated by means of a sleeve provided with a rod the axis of which passes through a hallow shaft.

If the sleeve is moved in the opposite direction, it acts upon the brake disks.

The movement for the oil pump is taken from the clutch housing and consequently the pump supplies the machine mechanisms with lubrication all the time the electro-motor is running.

The gear box is built according to the structural formula $(2)\times2\times2=8$ and has two groups of sliding gears. Drawing No. 2 shows the machine kinematic diagram. To shift the gears for obtaining the 4 speeds provided mechanically by the gear blocks be moved by means of a control handle each. The gliding gears are shifted by 2 forks which slide through 2 parallel rods.

4.4. The link mechanism

The reciprocating rectilinear motion of the ram is obtained by means of an oscillating link mechanism. The movement from the gear box is transmitted to the toothed rim of the link wheel. In the guiding rails located on the link wheel is mounted the crankpin on which is placed the link sliding block. The distance between the crankpin and the wheel rotation centre can be modified by means of the central screw.

This screw can be turned by mean of a bevel gear-pair manoeuvred from outside. The stroke length is read on a graduated barrel. The link wheel performs a uniform circular movement around its axle. The link sliding block drives a swinging arm which is hinged at its upper end in the ram and at its lower end in the frame by means of a shackle.

The shackle is linked with the link by means of a bearing with 2 rows of rollers.

The link gliding block slides between the guides of the arm.

4.5. The ram

The ram glides between the guiding rails located at the upper part of the frame. In order to obtain a higher rigidity, the guiding system with adjustable key was abandoned and instead was adopted a guiding system with fixed dimensions.

The ram guiding rails are secured with screws on the seats in the ram body. Thus it was possible to use for the guiding rails a high grade material. Because removable guiding rails are used, it was necessary to install these in the ram plane of symmetry.

The ram position with respect to the part to be machined is adjusted by moving the upper hinge of the link arm.

At the ram upper end is mounted the toolhead. This is built so as to securely grip the tool, to lift it during the return stroke to ensure the manual or mechanical vertical feed, as well as the possibility if planing slating surfaces by rotating the cutter support.

The cutter head constists of:

— the rotating support which, by inclining the head with a determiner angle, permits the planing of inclined surfaces;

— the tool slide, which moves between the guiding rails of the rotating support, thus providing the cutter feed. The tool is secured in the tool holder on the tilting flap which during the return stroke permits the cutter to be lifted from the part to be machined.

The mechanical downward vertical feed of the cutter head is supplied by a mechanism of special design. A longitudinal cam which can be fixed on the frame in various positions controls the movement of a rod on which is secured a rack. This rod moves at a right angle with the ram movement direction. A spring keeps the rod in contact with the cam surface. The rack reciprocating movement is transmitted to a gear, wherefrom it is communicated by means of a roller clutch, in a single direction, to the vertical screw of the cutter head.

For adjusting the feed is used a graduated barrel. When this barrel is rotated, a bushing limiting the rack rod stroke length is turned by means of a worm gear.

4.6. The feed mechanism Drawing No. 3.

The table vertical and cross movements are obtained from the link wheel shaft and are converted by a mechanism having its own housing and forming an independent unit. During a ram double stroke, a single horizontal or vertical feed movement will take place, whose length can be adjusted steplessly. Actuating the rapid feed does not imply the modification of the feed mechanism adjustment.

The connecting rod (h) transmits the reciprocating movement realized from the link wheel to the lever (b), which will have a swinging movement around the hinge (A1).

Lever (c) transmits the movement to (A3) hinge, thus communicating to the toothed segment (d—f) a swinging movement around axle (P2). To adjust the feed, the gear (i) which increases or reduces the distance between hinges (A1) and (A3) must be turned from outside.

When (A1) and (A3) hinges come to a coinciding position, the advance is nul.

From the (f) toothed sector the movement is transmitted through the gear (g) and the one direction roller clutch, to the shaft (II). From the shaft (II) the intermittent movement (in a single direction) is transmitted, through a bevel gear, to the III telescopic shaft, which makes the connection with the table support. The rapid feed is supplied by a separate electro-motor. The rotating movement of this motor is transmitted through a worm gear and a one-direction clutch to the (II) shaft. The rapid feed is set in motion by switching the motor on. The technological feeds of the table, that is the horizontal, the vertical downwards and the vertical upwards feed, being supplied by a continuous feed movement, have different values and can be modified steplessly. Since the feeds obtained depend also on the table load and on the clearances admitted between the various elements, the actual feed shall be read on the graduated barrels located on the table support. The barrel serving for the setting of the continuous feeds shall be adjusted to a position corresponding to the cutting conditions selected. It is recommended not to turn the control barrel beyond the limit positions engraved on it.

4.7. The table and the cross support

The table support glides along the vertical guiding rails on the machine frame and sustains the table which glides along horizontal guiding rails on the support. The intermittent movement caused by the feed mecanism is transmitted through a telescopic shaft, an overload coupling and a number of bevel gears, to the feed movements correspond to the direction in which the switching hangle is moved.

The feed movements are obstained by means of the driving screws located in the support. The table, which has the shape of a parallelipiped, is made of cast-iron and has T-shaped grooves for securing the half-finished parts. In order to increase its rigidity during the operation, the table rests in front on a bracket.

4.8. The central lubricating system

The central lubricating system insures the permanent lubrication of all the machine parts enclosed in the frame. The lubricating system begins to work the moment the driving electric-motor is started.

The pump draws oil through a suction strainer from the tank located within the lower part of the frame. The oil is sent under pressure through a filter to a distributor located on the upper frame surface, below the ram, so that it may be easily accessible when the ram is drawn to the front. The sight glass installed on the frame permits the checking of the guiding rail lubrication.

4.9. The electric equipment

The purpose of the electric equipment is to permit the control and the protection of the machine electric motors.

The protection in case of short circuit is ensured by means of $e_1 \ldots e_{13}$ fuses. The protection in case of long time overloads is obtained through $e_{14} \ldots e_{17}$ thermal relays.

The main motor is connected through 3 contactors and the rapid feed motor through one connector.

The motor starting and stopping at various speed is controlled through push-buttons.

The microswitch installed on the coupling handle does not permit the main motor to be started or its speed to be changed except when the clutch is uncoupled.

The electric connection diagram permits the motor to switch to a higher speed only when the motor has already run at the next lower speed.

A cut-off switch permits the rapid feed motor to be switched on only when the clutch is uncoupled.

4.10. The tool lifting device

On one side of the ram is secured a support which is mounted, by means of an eccentric bushing, on oscilating arm. The lower part of this arm, having the form of a section of circle is lined with a leather band. Through the rotation of the eccentric bushing, the circular section is getting near and pressing, so by the change of the sense of motion of the ram the arm receives an oscillating movement. The upper part of the arm, through a system of joint levers, will work upon the cutter flap, that will be raised together with the cutting tool.

The size of the lifting stroke of the cutter, can be adjusted with a striated head bolt, resting on a buffer.

The eccentric bushing is locked in the required position with the aid of a jugged sleeve, and a hexagonal nut.

The approaching stroke of the cutter, to the material to be worked, has to assure the necessary space for the adjusting of cutter support in working position.

5. INSTALLING THE MACHINE

5.1. Transportation conditions

For transportation purposes, the machine is secured by means of bolts on to a wooden base. The packing may be of two kinds: a) for short distance railway transportation, and b) for overseas shipping.

On the machine packing case shall be printed the following inscriptions:

— Up. Do not turn over! Handle with care!
— The sender's address.
— Name of ware: S 800 Shaping machine.
— The recipient's address.

All machined and unpainted parts of the machine should be protected during transportation by means of an anticorrosive grease-layer applied on them. The same protection shall be applied to the machine accessories as well. On receiving the machine, the recipient must satisfy himself that it has not been damaged.

Before removing the machine from the packing case, the latter shall be carried to a point as near as possible to the place where the machine is going to be installed.

Moving the machine from one point to another may be done either by means of a crane or, in the absence of such a crane, on rolls.

When moving the machine by means of a crane, two metal bars with a minimum diameter of 45 mm and sufficiently strong ropes shall be used. In oder to hoist the machine, it must be tied with the ropes as shown in the hoisting diagram, drawing No. 11. Between the ropes and the machined parts of the machine shall be inserted wooden sticks or felt pieces.

Shicks and jerks should be avoided and protruding parts of the machine should not be exposed to blows. If the machine is moved on rolls, great care should be taken and the machine shall not be removed from its original wooden base. The angle of the incline of the unloading platform shall not exceed 15°.

5.2. Setting the machine upon its foundation

In order to ensure the good and accurate operation of the machine, its foundation should be built an shown in the foundation plan (drawing No. 12). The cement dosage shall be 300 kg/m³. After the concrete has been poured in and has set sufficiently, the machine is installed upon the foundation.

The tolerance permitted as regards the horizontal setting of the machine is 0,05 mm/m. To check the correct setting, an air-bubble level is used by placing it on the surface of the vertical guiding rail of the cross support. After setting the machine in a horizontal position, the foundation bolts are introduced through the frame holes in the corresponding foundation holes. The latter are then filled up with cement slurry. The foundation bolts shall be tightened only after the cement has perfectly hardened.

After the cement has hardened, the horizontal position of the machine shall be checked again.

6. SERVICE INSTRUCTIONS

6.1. Preliminary operations

Before putting the machine into service, the present instructions should be thoroughly studied. After securing the machine onto the foundation, the anticorrosive grease layer shall be removed by wiping with cotton-waste soaked in kerosene. It is forbidden to remove the dried up grease by scraping with metal tools or with abrasive paper. After the machine has been cleaned of the protective grease, a thin film of oil shall be applied on the working surfaces and the machine shall be lubricated in all the points as described in the present instructions (chapt. 8.2).

The machine shall then be grounded by means of the screw provided to this end. The main switch (item 18, drawing 1) being on the „off" position, the electric equipment of the machine shall be connected to a three-phase alternating current source.

The clutch being uncoupled (the handle being in the „off" position), the electric equipment shall be put under voltage with the aid of the general switch and then the electro-motor shall be started by pressing on the starting push-button. Through the opened door located opposite the belt pulleys, the sense of rotation of the electric motor is checked. If it does not agree with the direction indicated by the arrow, two of the phase-wire at the inlet connection shall be interchanged.

Before finally putting the machine into service, it is recommended to check if no unduly tight places are found in the machine and if the ram does not run against any obstacle.

To this effects, the machine electric equipment is cut off by means of the general switch the clutch is coupled by placing its handle in the „on" position and the belt pulley is turned carefully by hand.

Before starting the machine, the double stroke and the ram stroke are adjusted so as to fall within the limits established in the working chart.

It the machine is operating normally, the current connection is re-established, the electric motor is started and the oil pump operation is checked through the sight glass 5 (drawing 5). If necessary, the large lateral door is opened, the admission pipe is disconnected from the pump and is filled with oil. If the lubricating system functions normally, it should be checked how the machine responds to the controls, i.e. the operation of the general stopping button, the clutch, the brake, the feed control and of the rapid feed shall be checked.

When the machine is started for the first time after is was installed, it is recommended to let it run idle for an hour at each speed stage. Subsequently, during the first 24 hours of operation, the machine shall not be loaded in excess of 25% of the electric motor power.

6.2. **Starting and stopping the machine** (drawing No. 1)

When the control circuit is under tvoltage, the signalling lamp on the control panel shines.

Starting the driving electric motor or pressing from one operating state to another is possible only through uncoupling the clutch. By pressing the low speed starting push-button 29, the electric motor set in motion. Higher speeds can be selected only after the electric motor has started first at a lower speed. To this effect, the clutch is uncoupled and the (30) control pushbutton is pressed. The speed at which the electric motor is turning is indicated by the signalling lamp which is shining in the corresponding control push-button. To stop the main electric motor, the (28) dome-shaped stopping button should be acted upon. Coupling and uncoupling the machine is effected by means of handle (12). If the handle is pulled out, the brake starts working.

Before stopping the main driving electric motor, the clutch should be disconnected every time.

6.3. **Adjusting the ram stroke length and its relative position**

In order that the planing operation may be as economical as possible, the ram stroke lenght must be as nearly equal to the chips' length. The free running before the tool touches the part and after leaving it are established according to the tool size.

If a tool raiser is used, account shall be taken of the distance necessary for lifting and feeding the tool. The ram stroke length can be modified by turning the (20) square head shaft (drawing No. 1) with a handle. The adjusting shall be performed with the ram stopping during its active stroke, preferably in the middle position.

The ram stroke can be read on a graduated dial. Before adjusting the ram relative position, it should be checked whether the tool slide does not butt against the frame on its return way.

This is an important point especially when slanting surfaces are machined. In order to adjust the ram position with respect to the part being machined, the ram shall be stopped in the extreme rear position by uncoupling the clutch. The junction of the ram with swinging arm is disconnected by loosening handle 10 (drawing No. 1). By means of a crank, the (8) square head is turned until the ram has come in the desired position and then handle is tightend anew.

6.4. Adjusting the number of ram double strokes per minute

Choosing the number of ram double strokes per minute is done with the aid of the machine working diagram. In this diagram are drawn:

— the ram stroke length, in mm;
— the average cutting speed, in m/min;
— the number of ram double strokes per minute;
— the table feed, in mm per double stroke;
— the time necessary for machining a 10 mm wide strip with the given speed and feed.

Depending on the material to be machined and the nature of the operation (roughing or finishing) the average cutting speed and the feed are chosen. The cutting speed is inscribed on the left side of the working diagram, on the vertical line. The active stroke length is read on the upper horizontal side of the diagram. By joining the vertical line representing the stroke length with the horizontal line representing the cutting speed chose, a point is found which may either coincide with one of the inclined lines of the diagram or be situated at proximity of one of these. On the inclined line near which is located the crossing point, is inscibed the number of double strokes per minute for which the machine must be adjusted. In order to perform the adjustment, (13) handles (drawing No. 1) shall be turned so that their position shall correspond to the number of double strokes chosen. On the handle labels are inscribed two values which correspond to the two speeds of the electric motor. To modify the number of double strokes, the ram must be first disconnected and stopped. If the sliding gears refuse to get geared in, a short jerk should be given by means of the clutch handle.

CAUTION! It is forbidden to exceed the maximum stroke length permitted for the number of double strokes per minute at which the ram is working.

These figures are indicated in the working diagram through breaking off the inclined lines respresenting the number of double strokes. With the aid of the working diagram it is also possible to compute roughly the time necessary for machining a 10 mm wide strip. To this effect, a horizontal line is drawn from the point representing the cross feed for which the machine was adjusted until it meets the inclined line representing the number of ram double strokes. From this point a vertical line is drawn down to the lower border of the diagram on which is read the time in minutes necessary for machining a 10 mm wide strip.

6.5. Adjusting the feeds

6.5.1. In order to obtain the desired feed, the handle (22) (drawing No. 1) should be rotated and the feeds obtained may be read on the graduated drums located on shafts IV and (drawing No. respectively). The weed direction (horizontal or vertical) and the direction thereof (to the right, to the left, downwards, upwards) are established with the aid of the handle (23) (drawing No. 1).

The handle position corresponds to the direction and sense of the table movement.

While the adjustment of the table position is in progress, the rapid feed may be used. To this effect, the ram movement is disconnected. The handle for the control of the feed direction is placed in the corresponding position, after which the electric motor for the rapid feed is started by pressing the (27) starting push-button. The rapid feed is in operation as long as the push-button on the control panel is kept depressed.

6.5.2. The tool-slide feed

The tool-slide can work with automatic advance only in downward direction. The tool-slide feed is used especially for machining slanting surfaces. To this effect, the logitudinal ram is secured to the frame by means of the two rosettes, as required by the ram position. By means of the (7) rosette is established the value of the vertical feed, by bringing the chosen value marked on the drum opposite the index thereof.

7. MAINTENANCE OF THE MACHINE

7.1. General rules

While the machine is in operation, the servicing, maintaining and lubricating rules described in the present instructions must be strictly complied with.

After each work-shift, the machine must be cleaned of dirt, dust and shavings, particular attention being given to the guiding surfaces. No rubbish should be also tolerated around the machine.

Machined or semi-machined parts lying in disorder, or heaps of shawings, may easily be the cause of serious accidents.

Every week the machine needs general cleaning. While any adjusting, fastening or loosening of parts is taking place, as well as during measurements of same, the ram must be stopped. While the electric equipment, the coupling, the driving belts, the oil distributor are being adjusted or the machine is under repair, the electric motor shall be stopped and the mains switch put on the „off" position.

While the machine is in operation, the temperature of the guiding rails of the frame is checked. The temperature of the gliding bearings should also be checked; it must not exceed the permissible values. Every week the tension of the V-belts must be checked. The moving organs are tight-fitted. Clearances on guiding surfaces and bearing shall be checked with the aid of feelers with the occasion of periodical checkings.

If necessary, the initial clearance of 0,03 mm, which shall be uniform on the entire length of the guiding surfaces, should be restored by scraping the corresponding surface.

7.2. Lubrication

Lubrication of the most important parts of the machine is effected automatically and in centralized way by means of an oil pump. The ram, cross support and the table are provided with points for manual lubrication.

The lubrication points, the lubricant used and the time periods for lubrication are shown in the attached lubrication chart (drawing No. 6).

The oil necessary for the centralized lubrication is poured through the lateral door into the basin located in the lower part of the frame.

The oil is changed for the first time after 96 hours of machine operation and afterwards at 5 — months intervals. To this effect the threaded plug 15 (drawing No. 5) located at the bottom of the basin is removed. Before changing the oil, the machine should be running for about an hour, so that oil in the basin may be warmed up. After draining the oil, the plug closing the draining opening shall be put back in place and the basin shall be washed with a smaller quantity of pure oil. Then the oil pump is started. When the pump has been in operation for about 10 minutes, the basin is again emptied and then filled with oil through a funnel provided with a sieve.

If any mechanisms, especially the ram guiding surfaces, are not sufficiently lubricated, the oil distributor located at the rear of the frame must be adjusted. The ram guiding surface lubrication is observed through the sight glass 5: the oil must drip from both pipes approaching in the window. If there is no oil apparent in the window, the machine must be stopped immediately until the defection is repaired. This defection is probably caused by the clogging of a duct, by the faulty adjustement of the distribuitor, by the unsatisfactory operation of the oil pump or by dirt obstructing the passage the section strainer:

If the oil level in the basin drops, the oil must be replenished, since otherwise the pump may draw air, which might lead to its coming to a standstill. The pump filter must be cleaned by washing it periodically with kerosene at the time the oil in the basin is being changed or at any moment when it is found out that impurities have penetrated into the central lubricating system.

7.3. Adjusting the clutch

The disk clutch is located on 1 shaft of the gear box (on the same shaft as the belt pulley). The disk clutch is accessible by opening of the lateral door next to the oil pump (the pump being driven by the clutch casing).

The clutch can be adjusted as follows: by lifting 20—35 plate, the 20—30 latch is withdrawn, thus releasing 20—32 nut, by whose turning is adjusted the clutch clearance. When this operation is finished, the system is locked again by means of the 20—33 latch and 20—35 plate.

The clutch clearance must be as small as possible, but so chosen as not to allow the movement to be transmitted from the motor to the gear-box when the clutch is released.

7.4. Maintenance of the electric equipment

It is actually necessary, to permanently supervise the electric equipment. Before handling the electrical equipment, the control pannel shall be disconnected from the electric network by means of the main switch. Once a month, a check should be made on how the machine responds to the controls. If the contact surfaces are covered with oxidation spots, they should be cleaned with abrasive paper. The defective contactors shall be taken down and replaced.

The contactor of the grounding screw must be also in good condition.

Once a year, the motors must be examined in detail by a specialist, who shall check the condition of the ball-bearings and windings. The defective ball-bearings must be immediately replaced.

At the same time all ball-bearings must be lubricated with grease.

8. CONTROL AND ATTENDANCE ELEMENTS

The control elements are concentrated on one side of the machine, while the most frequently used elements are arranged on a control panel.

The following is a list of the names and purpose of the control and attendance elements (see drawing No. 1):

1. Locking of the table support.
2. Fastening of the tool.
3. Locking of the tool slide.
4. Rosette for fixing the tool-post moving screw on the automatic feed.
5. Hand-wheel for moving the tool-slide.
6. Nut for fixing the rotating head of the tool-slide.
7. Rosette for adjusting the automatic feed of the tool-slide.
8. Changing of the ram position.
9. Locking of the cross support.
10. Locking of the ram with respect to the link arm.
11. Coupling and releasing of the tool-lifting device.
12. Clutch and brake control.
13. Handles for changing the number of double strokes.
14. Fixing of the tool support.
15. Fixing of the slide for the tool-support feed.
16. Horizontal moving of the table.
17. Vertical moving of the table.
18. Main switch.
19. Terminals for connection to the network.

20. Adjusting of the ram stroke length.
21. Locking of the variation of the ram stroke length.
22. Adjusting of the table feed.
23. Coupling of the feed direction.
24. Stops for the vertical stroke of the cross support.
25. Local lighting.
26. Signalling lamp for coupling the main switch.
27. Rapid feed.
28. Stop.
29. Starting on first speed of main motor.
30. Starting on second speed of main motor.

9. LABOUR SAFETY RULES

The labour safety rules are intended to set up regulations concerning the measures to be taken while the production processes are in progress in order to prevent labour accidents and professional diseases.

Workmen working at the shaping machine must know and apply the labour safety instructions drawn up for workers at machine-tools and shaping machines, as included in the corresponding regulations.

The most important of these are reproduced below.

— The shaping machine shall be serviced only by persons knowing its operation and controls, it is forbidden for all other persons to start the machine or to work with it.

— The parts in process of machining or the wastes shall be so arranged as not to impede the work, the normal operation of the machine or the circulation on the access ways.

— Particular attention should be given the proper fastening of the part on the machine, in order to prevent any possibility of its being pulled off. The key having served for fastening, the part shall not be left in the clamping device after the latter has been lightened.

— Before starting the ram, the proper securing of the tool in the support shall be checked.

— It is compulsory to stop the machine the moment the work with it is suspended.

The machine shall also be stopped:

— while the tools are being changed;

— while the part to be machined is being fastened on or taken off the machine;

— while the parts to be machined are being measured;

— while the machine is being cleaned or lubricated;

— while the shavings are being removed;

— while performing repairs of any kind.

It is forbidden to take down the lids covering the machine moving elements or to work with the frame doors opened.

The shavings should be removed with the aid of brushes.

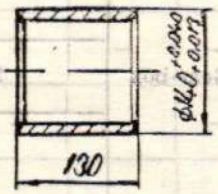
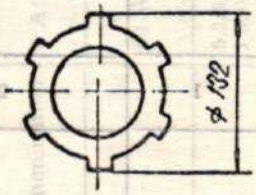
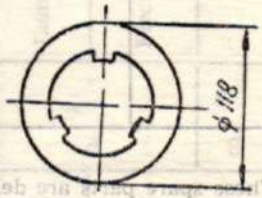
It should be avoided as much as possible to stand in the way of shavings.

If the machine is located with its back at the proximity of the workshop wall, between the extreme position of the ram and the wall must be left a completely free 0,7 m wide passage way.

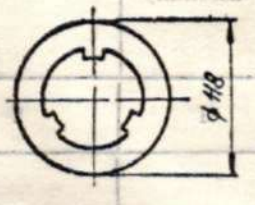
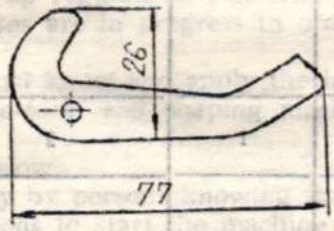
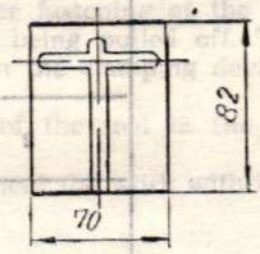
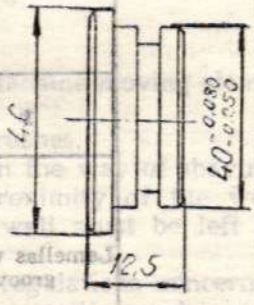
In order to avoid accidents through electrocution, regulations concerning the electric equipment should be strictly abided by both in installing and in servicing and maintaining them.

Care should be taken that the machine is permanently grounded. Before proceeding to any handling of the electric equipment, this shall be taken off the electric circuit with the aid of the main switch.

Spare parts
and wearing parts

Item No	Denom of sub-assembly	Denomination of piece	No of. piece.	Piece/machine		Remark
0	1	2	3	4	5	6
1	Body	Sleeve	10—52	2		
0	1	2	3	4	5	6
2		Disk with int. groove	20—26	2		
0		2	3	4	5	6
3	Gear-box	Lamellas with ext. groove	26—72	11		
0		2	3	4	5	6
4		Lamellas with int. groove	20—28	9		

Spare parts
and wearing parts

0	1	2	3	4	5	6
5		Disk with int. groove	20—29	1		
0	Gear-box	2	3	4	5	6
6		Coupling gripper	20—30	3		
0	1	2	3	4	5	6
7	Link	Link stone	80—05	2		
0	1	2	3	4	5	6
8	Lubrication installation	Sight-glass	70—30	1		

These spare parts are delivered only on special order.

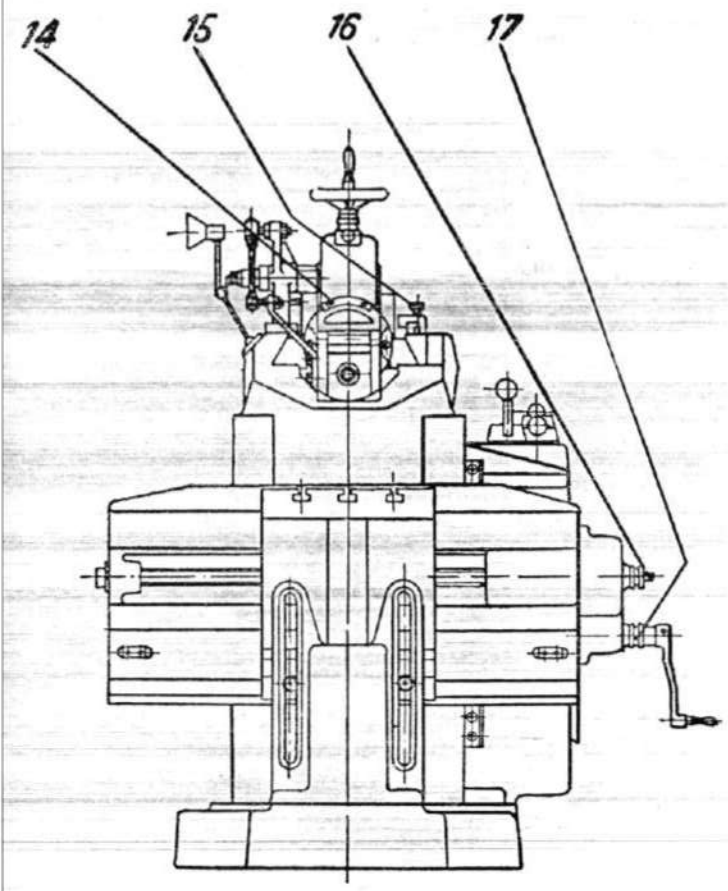
9. SWITCHGEAR SPECIFICATION

No.	Symbol	Denomination	Characteristics	Type	Purveyor	Piece/var. U (v)						Remark
						220	380	400	415	440	500	
0	1	2	3	4	5	6	7	8	9	10	11	12
1	a	Three-pole switch	40 A; 500 V;	~~984~~ ~~C 40~~ C32.0202.01	Electro-aparataj București	1	1	1	1	1	1	
2	b_1; b_2	Button with lamp	2 A; 380 V; U_L=24 V, P_L=3 W	~~2877~~ ~~2909~~		2	2	2	2	2	2	
3	b_3	Mush room button	2 A; 380 V; red	2863/A		1	1	1	1	1	1	
4	b_4	Microswitch	2 A; 380 V;	3306		1	1	1	1	1	1	
5	b_5	Control knob	2 A; 380 V; ~~green~~ black	2907		1	1	1	1	1	1	
6	b_6	~~Retention button~~ 2 pos. returning switch	2 A; 380 V; ~~green~~ black	~~2863~~ 2939		1	1	1	1	1	1	
7	h_3	Signalling lamp	1,5 W; 24 V;	2901		1	1	1	1	1	1	
8	h_4	Lampholder for illumination	4 A; 250 V;	CIAM02	Electro-banat Timișoara	1	1	1	1	1	1	
9		Electric bulb	60 W; 24 V;	—	Steaua electr. Fieni	1	1	1	1	1	1	
10	m_1	Asynchronous electricmotor	5,2/6,5 kW 1 500/3 000 rev/min	ASIt-132 M32-4/2	Electro-precizie Săcele	1	1	1	1	1	1	Tension dependingen the var.
11	m_2		1,5 kW; 1 500 rev/min	ASI-24F —165 L		1	1	1	1	1	1	

0	1	2		4	5	6	7	8	9	10	11	12
12	e_1; e_2; e_3	Fuse plug	LF 63/63 A	2 041	Electro-metal Cluj	3	—	—	—	—	—	
13			LF 63/35 A			—	3	3	3	3	3	
14	e_6; e_7; e_8		LF 25/16			3	—	—	—	—	—	
15			LF 25/10 A			—	3	3	3	3	3	
16	e_{10}; e_{11}		LF 25/2 A	2 031		2	2	2	2	2	2	
17	e_{12}		LF 25/4 A			1	1	1	1	1	1	
18	e_{13}		LF 25/6 A			1	1	1	1	1	1	
19	e_4	Thermal relay block TSA	32/32 A	3 672	E.A. București	1	—	—	—	—	—	
20			32/15 A			—	1	1	1	1	—	
21			32/11 A			—	—	—	—	—	1	
22	e_5		32/32 A			1	—	—	—	—	—	
23			32/20 A			—	1	1	1	—	—	
24			32/15 A			—	—	—	—	1	1	
25	e_9		32/8 A			1	—	—	—	—	—	
26			32/4,5 A			—	1	1	1	—	—	

0	1	2	3	4	5	6	7	8	9	10	11	12
27	e_3	Thermal relay block TSA	32/3,3 A	3672		—	—	—	—	1	1	
28	c_1; c_2; c_3	Three-pole contactor	500 V; 32 A; U_{bob}=24 V	TCA 32 4 010	Electro-aparataj București	3	3	3	3	3	3	
29	c_4; d_1		500 V; 10 A; U_{bob}=24 V	TCA 10 4006		2	2	2	2	2	2	
30			160 VA; 220/24 V			1	—	—	—	—	—	For 50 or 60 Hz depending on the variante
31			160 VA; 380/24 V		Electro-tehnica București	—	1	—	—	—	—	
32	m_3	Transformer	160 VA; 440/24 V cu priză la 400 V și 415 V	TMA 160		—	—	1	1	1	—	
33			160 VA; 500/24 V			—	—	—	—	—	1	
34			16 mm²	511		4	—	—	—	—	—	
35		Coupling connector	6 mm²	510		6	4	4	4	4	4	
36	L_1; ~~L_2~~		4 mm²	509	I.A.E.I. Titu	14	20	20	20	20	20	
37		End connector		511		1	—	—	—	—	—	
38				510		—	1	1	1	1	1	

Remark: The switchgear specification is only orientative. The switchgear can be different of the special one, as a constructive type with the condition of respecting the technical characteristics.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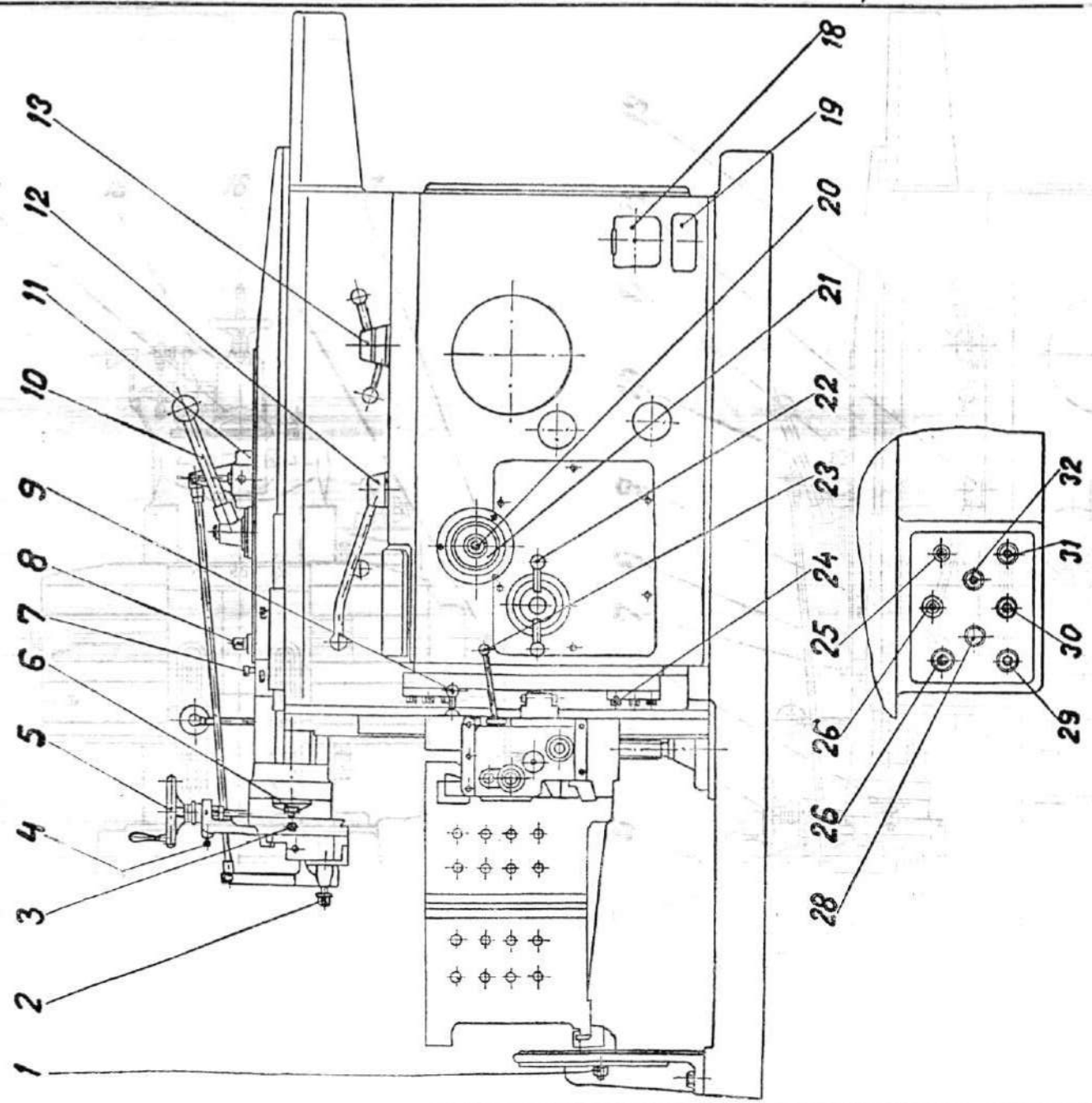
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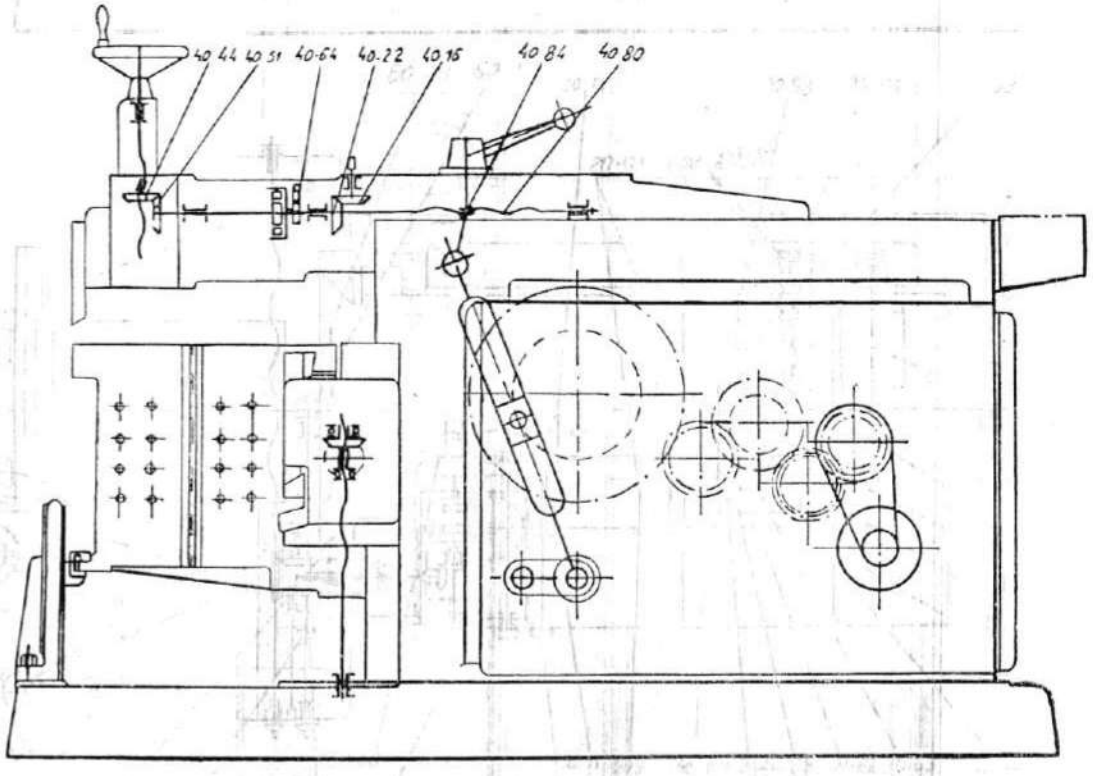
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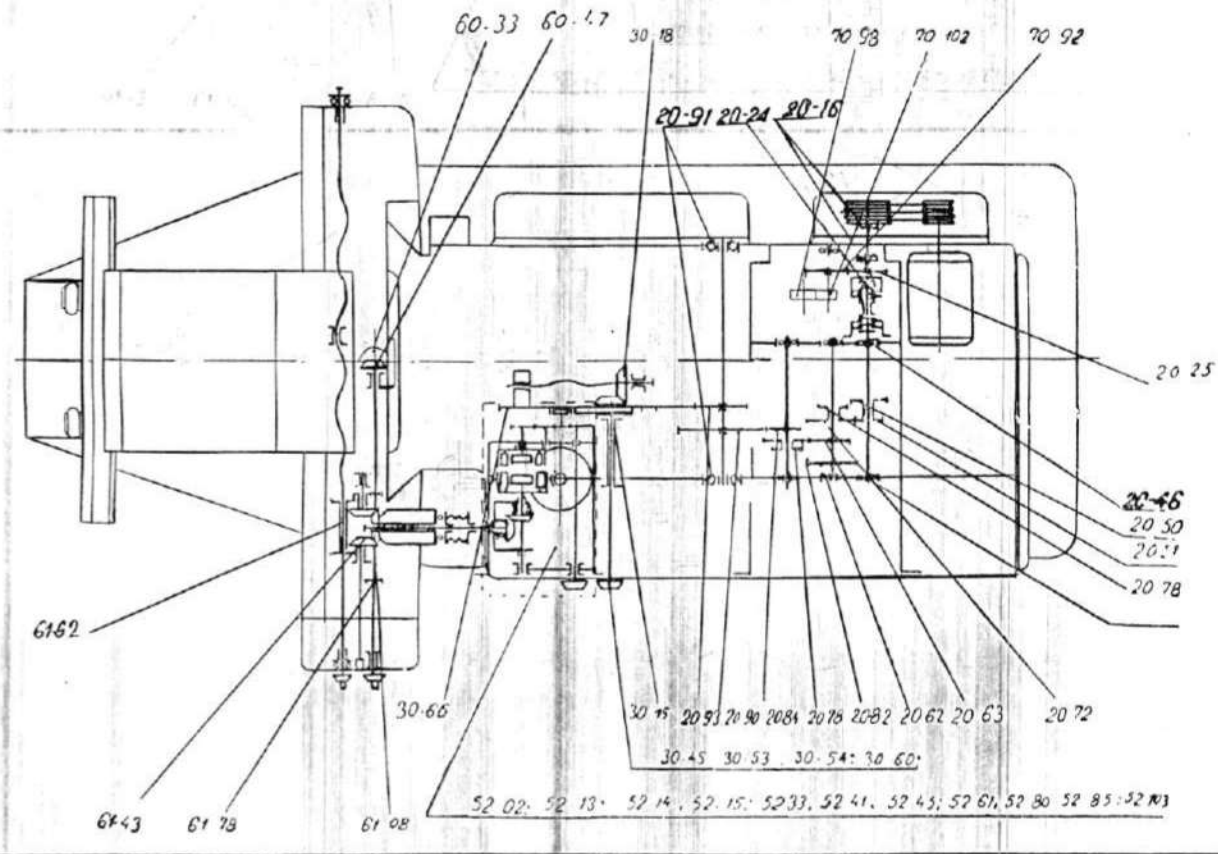
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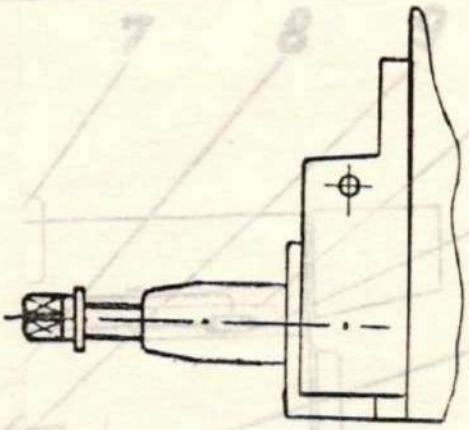

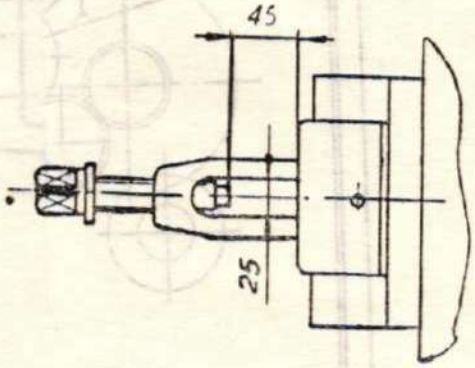
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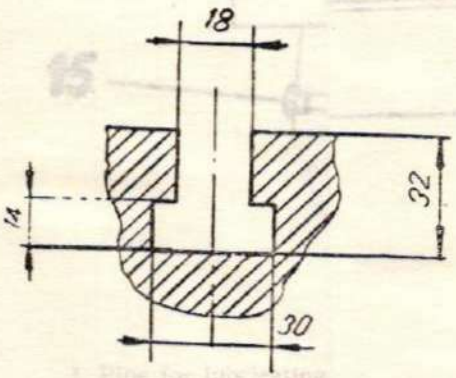
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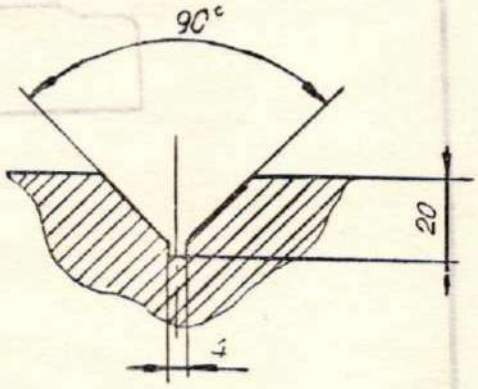
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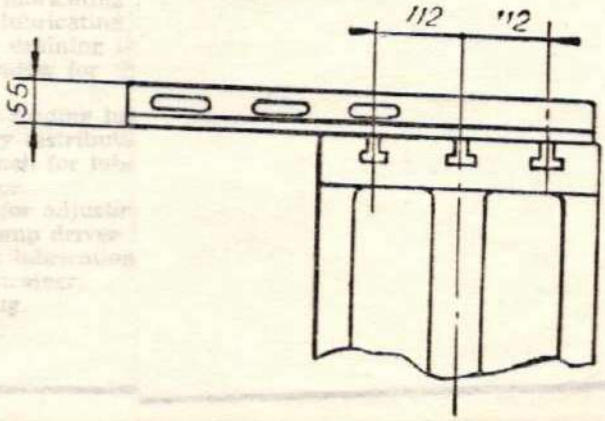
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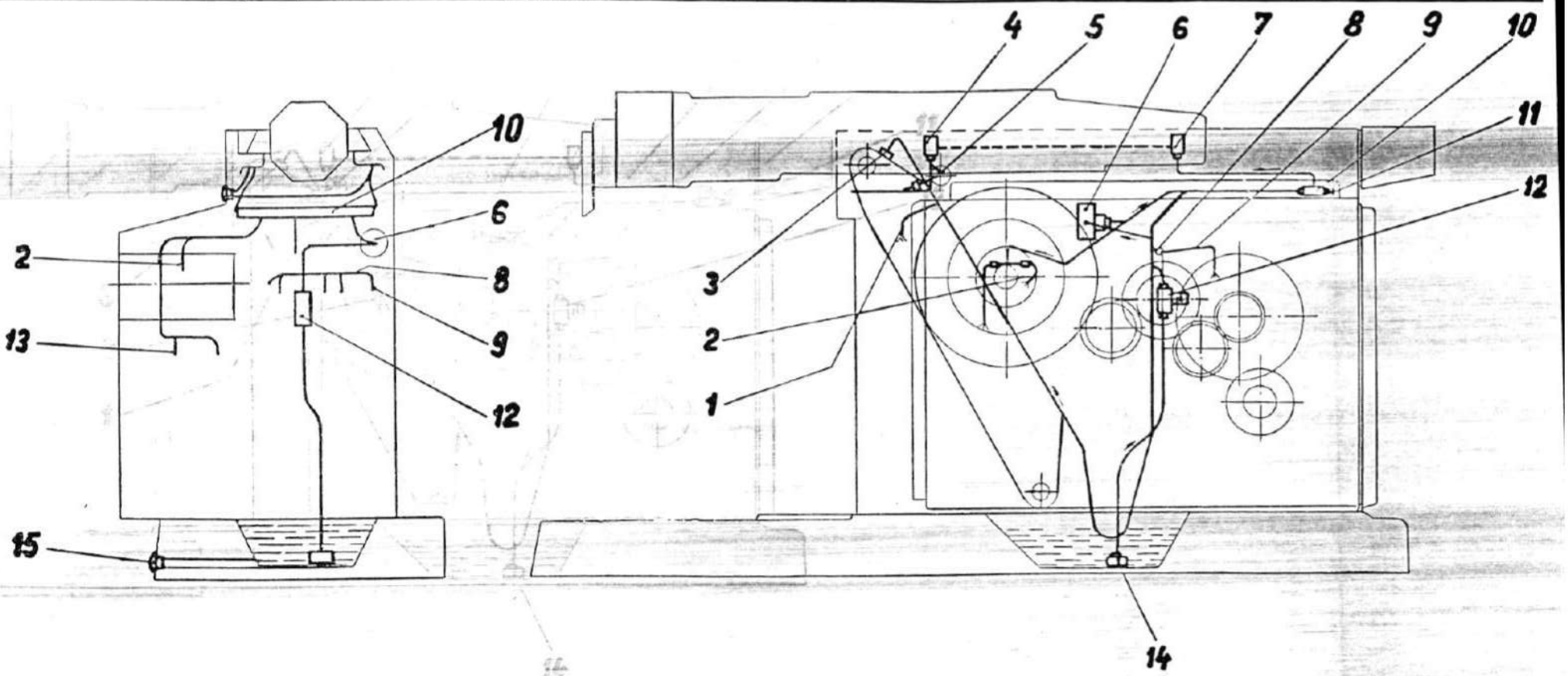

LEGEND:

1. Pipe for lubricating the link block guiding rail.
2. Pipe for lubricating the link wheel bearing.
3. Point of lubricating of the upper link joint.
4. Head for draining the oil from the ram guiding surfaces.
5. Sight window for checking the lubrication of the ram guiding surfaces.
6. Filter.
7. Head for feeding lubrication oil to the ram guiding surfaces.
8. Secondary distributor.
9. Pipe branch for lubricating the gear box and clutch.
10. Distributor.
11. Rosettes for adjusting the flow in the lubrication circuits.
12. Gear pump driven by the main motor.
13. Feed box lubrication.
14. Suction strainer.
15. Drain plug.

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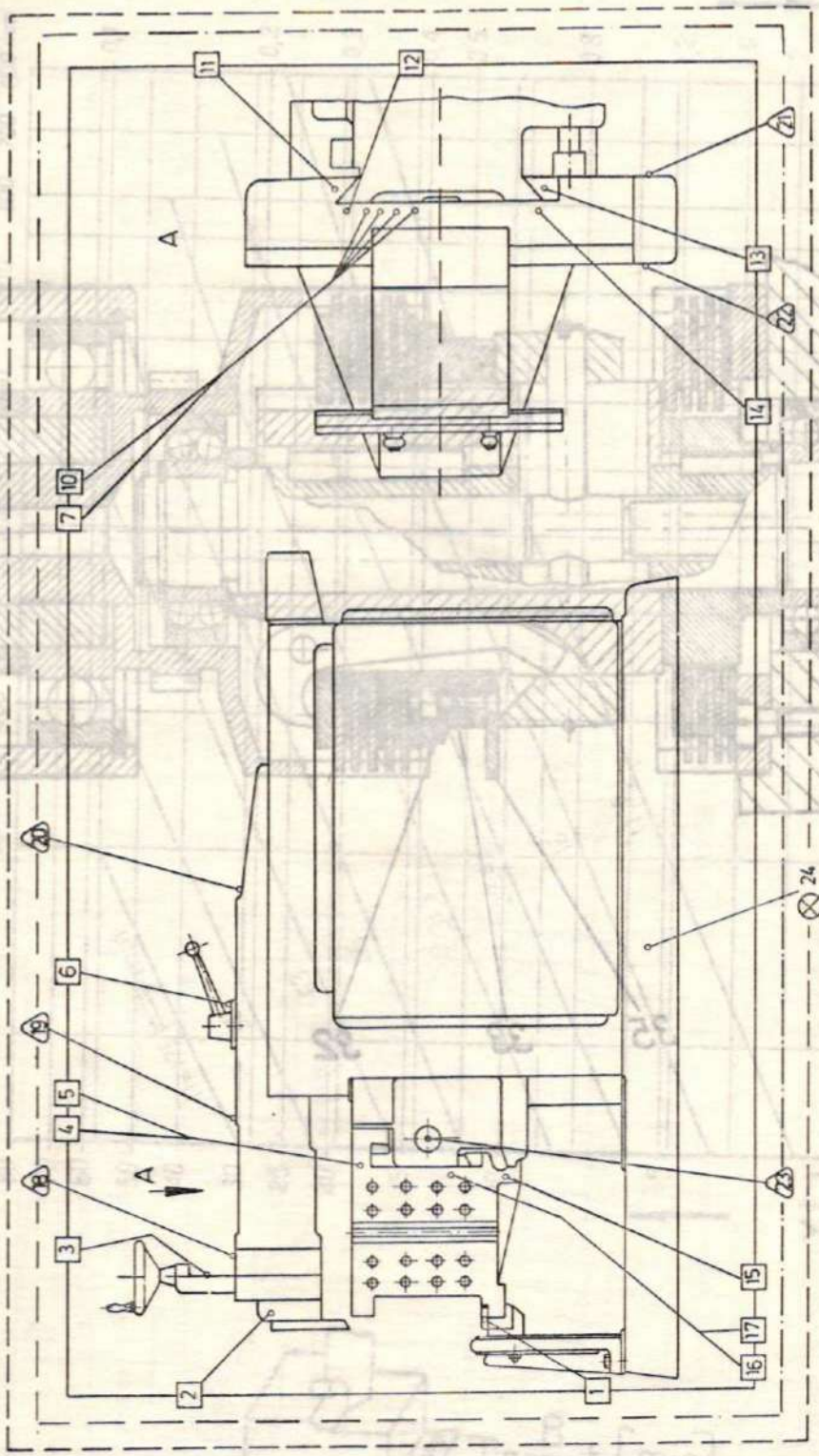
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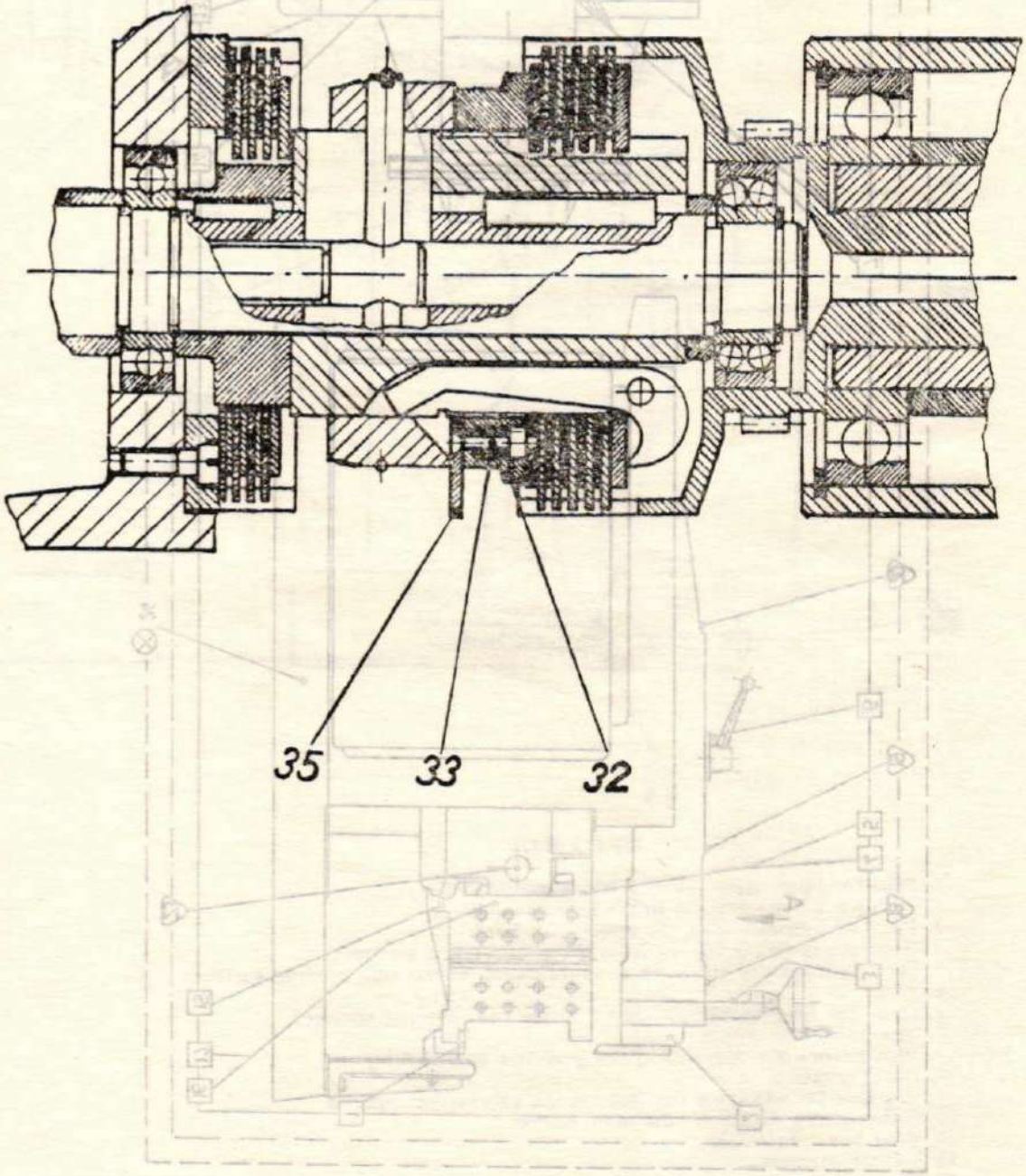
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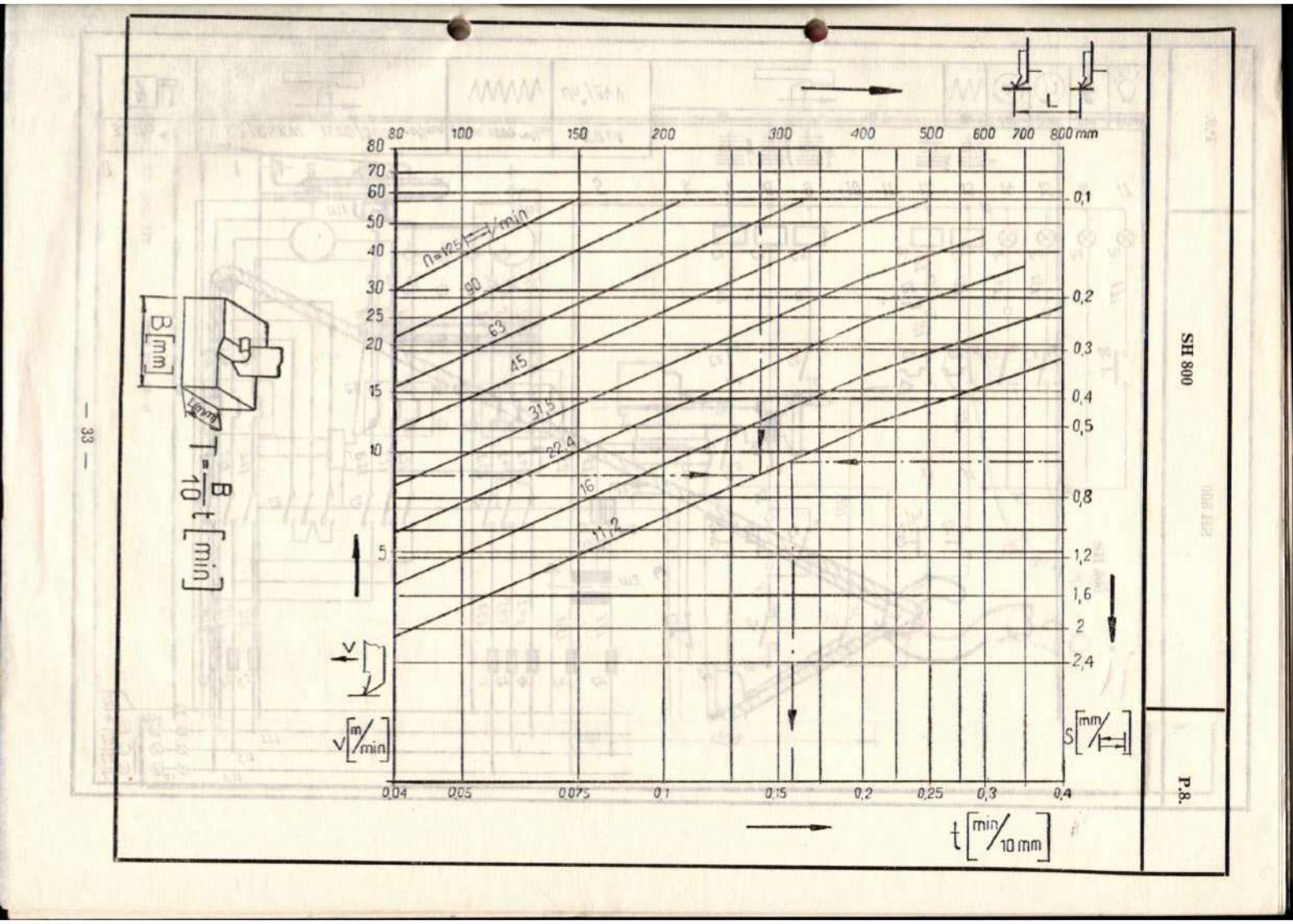
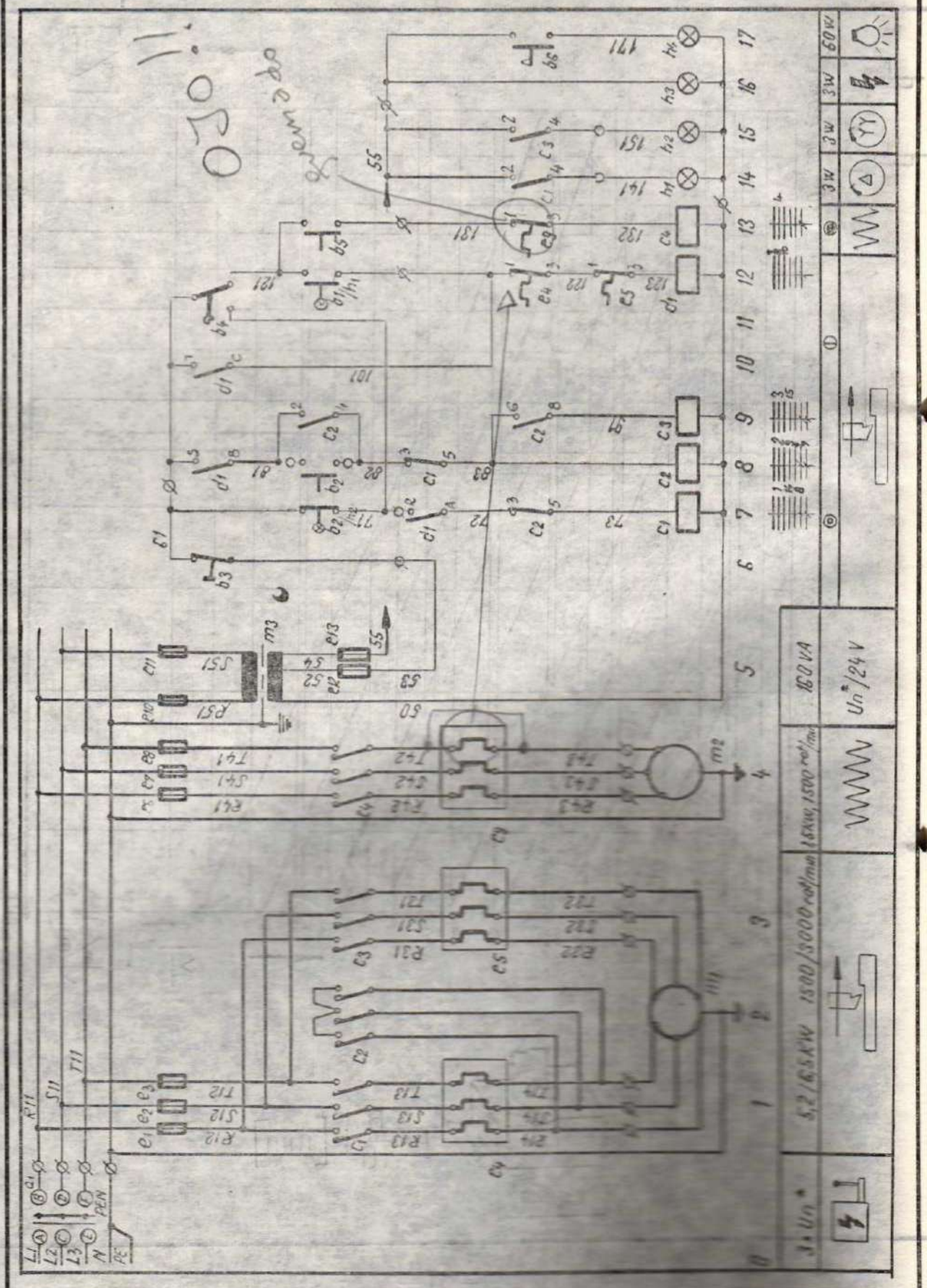
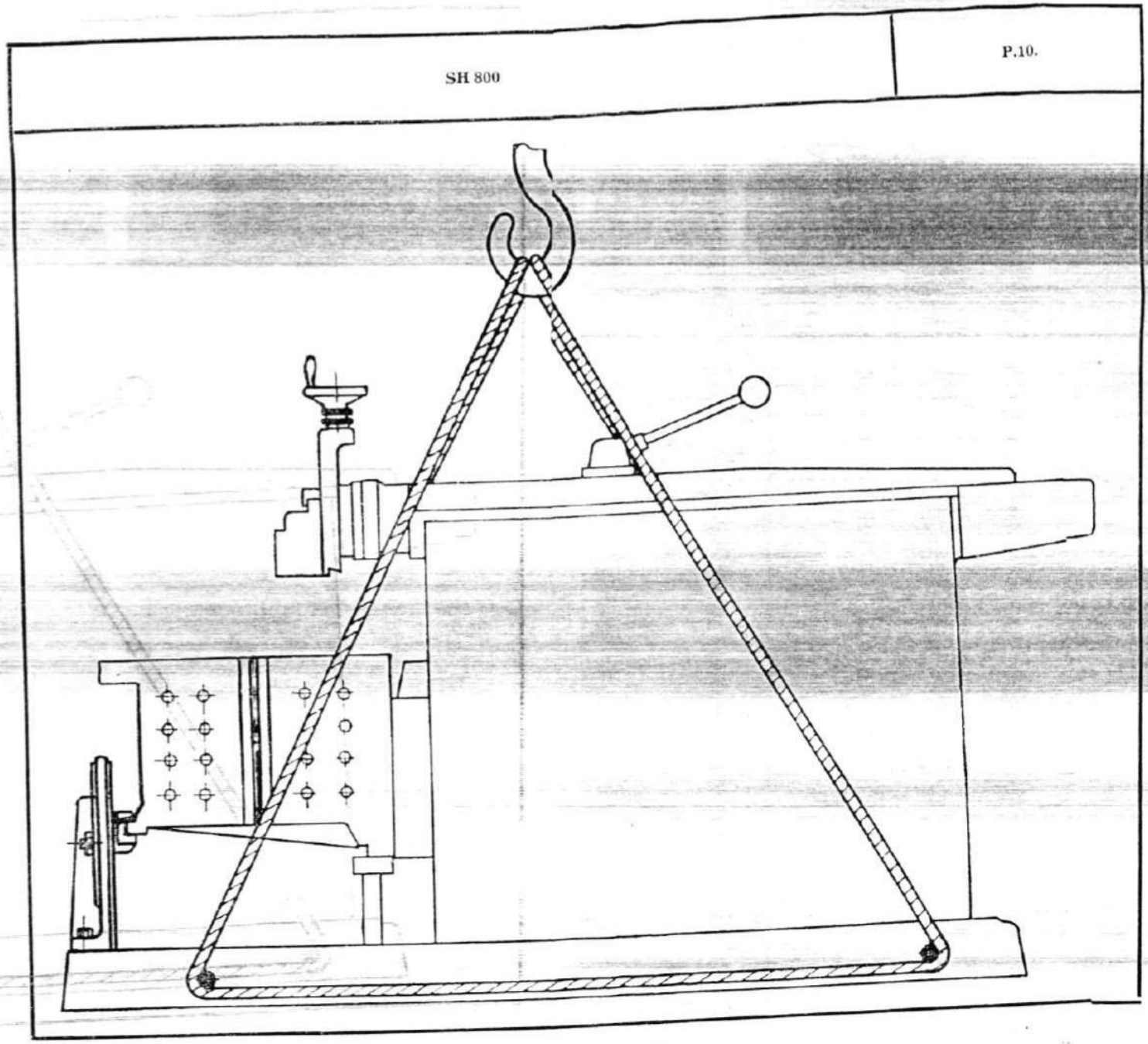

L
80 100 150 200 300 400 500 600 700 800 mm
80
70
60
50
40
30
25
20
15
10
5
n=125 1/min
90
63
45
31,5
22,4
16
11,2
0,1
0,2
0,3
0,4
0,5
0,8
1,2
1,6
2
2,4
B [mm]
T = B/10 t [min]
v [m/min]
S [mm/]
0,04 0,05 0,075 0,1 0,15 0,2 0,25 0,3 0,4
t [min/10 mm]

SH 800

P.8.


160 VA
Un*/24 V
5,2/6,5 kW 1500/3000 rot/min 4,5 kW, 1500 rot/min
3 Un*
60 W
3 W
3 W
3 W
L1
L2
L3
N
PE
PEN



Seping 800 com. 172

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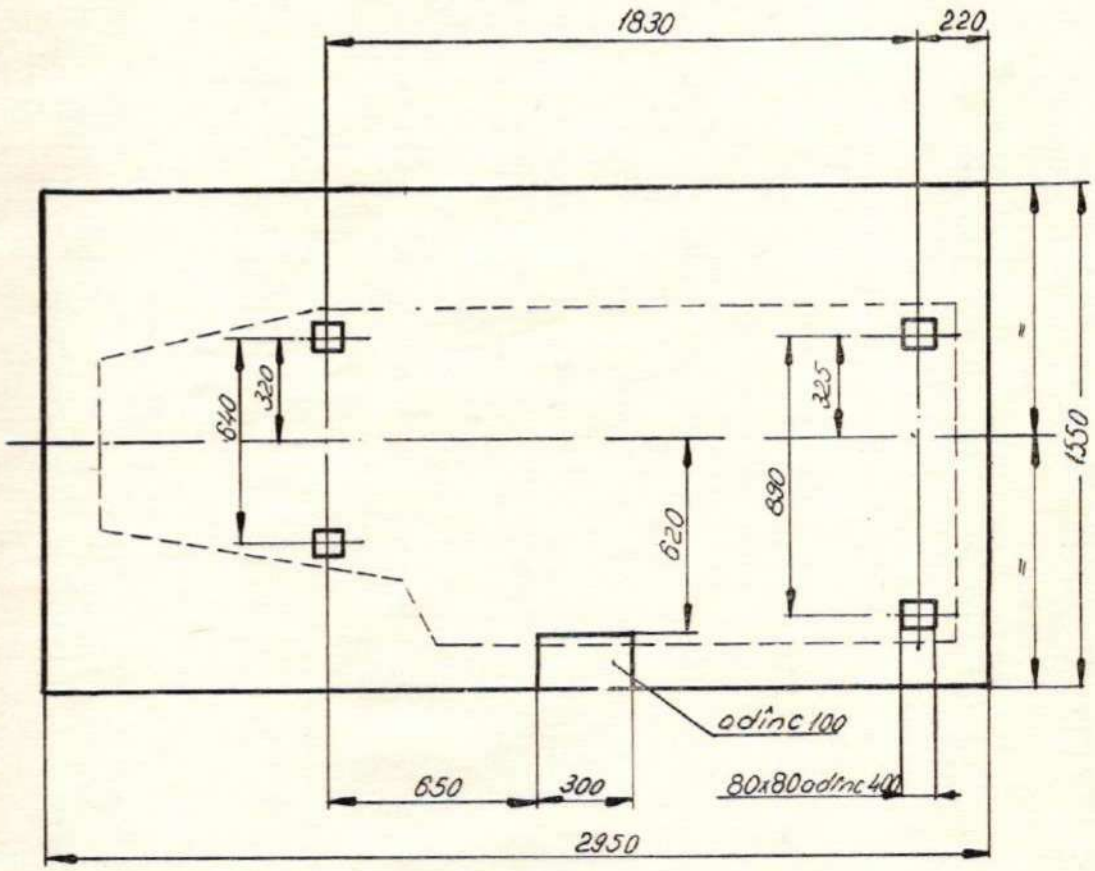

adînc=depth;

— Minimum depth 600 mm.